

A NUTRITION AND EXERCISE PROGRAM TO REDUCE EXCESSIVE GESTATIONAL  
WEIGHT GAIN

A DOCTOR OF NURSING PRACTICE PROJECT SUBMITTED TO THE OFFICE OF  
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By

Nora A. Phillips

Committee:

Maureen Shannon, Chairperson  
Stephen T. Foley  
Carmen Linhares

## Abstract

Despite guidelines published by the Institute of Medicine (IOM) for weight gain in pregnancy, many women in Hawaii and the United States (US) gain more than what is recommended. It is widely accepted that excessive gestational weight gain (EGWG) is linked to poor health outcomes for mothers and babies, therefore, efforts should be made to help women avoid gaining too much weight during pregnancy. This final project for the Doctor of Nursing Practice (DNP) degree is an evidenced-based nutrition and exercise program that aimed to reduce EGWG using educational and motivational strategies to monitor and provide guided feedback to pregnant patients in a women's health clinic on O'ahu.

All eligible patients at the project site were exposed to the practice change, and half of the patients at a different site for the practice did not receive the intervention. Data collection was done through chart review (baseline and post-implementation), and pre and post-implementation surveys. Baseline data collected from a sample of 1003 patients at both sites demonstrated that 39.9% of patients in the clinic experienced EGWG pre-implementation. For determination of change in EGWG after the project change, a total of 84 patients were included. Results demonstrated that EGWG was reduced from 39.9% to 26.2% in six months in the whole patient population (both sites, n=84). Further, 22.2% (n=45) patients that were exposed to the practice change at the implementation had EGWG compared to 30.8% (n=39) of patients not participating in the program. Results suggest that the DNP project contributed to a reduction in the number of women with EGWG at the project site.

A total of 85 women completed the diet and exercise surveys focusing on what women thought about gestational weight gain and nutrition and exercise during pregnancy. Results from the surveys revealed that the majority of patients felt the program helped to create positive

attitudes toward recommended weight gain (94.2%), nutrition (87%) and physical activity (89.9%) during pregnancy. Most of the patients (86%) reported an increase in physical activity intensity, duration, and/or frequency due to the intervention; and all participants responded that this program would benefit other pregnant women. These results suggest that pregnant women in other clinical practices could benefit from this or a similar intervention to help reduce the incidence of EGWG.

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# A NUTRITION AND EXERCISE PROGRAM TO REDUCE EXCESSIVE GESTATIONAL WEIGHT GAIN

Nurse leaders have an opportunity to focus on preventative health and wellbeing measures when providing care to patients. This evidenced-based (EB) initiative involved implementation of a nutrition and exercise-focused practice change to support weight gain during pregnancy that follows established national guidelines.

## **Definition of Problem and Need for Change**

Excessive Gestational Weight Gain (EGWG) is defined as inappropriately large weight gain during pregnancy and is assessed according to the guidelines of the IOM (Hui et al., 2012). The difference between pre-pregnancy weight and weight at the end of a pregnancy can be categorized into inadequate, adequate, and EGWG. According to the IOM (2009), EGWG is determined by pre-pregnancy body mass index (BMI): 40 pounds or above is considered excessive for underweight women (BMI <18.5), 35 pounds or above for normal-weight women (BMI = 18.5–24.9), 25 pounds or above for overweight women (BMI 25.0–29.9), and 20 pounds or above for obese women (BMI ≥30.0). This project focused on EGWG and ways to prevent women from gaining too much in pregnancy which is shown to have detrimental outcomes for mother and baby. Reduction of excess weight gain in pregnancy improves the quality of prenatal care and ultimately the health of mothers and their unborn children.

## **Consequences of Excessive Gestational Weight Gain**

Complications associated with EGWG in women include an increased risk of being overweight after delivery, or developing obesity, which in turn, largely raises the risk of serious chronic disorders, including diabetes mellitus, heart disease, and hypertension (Amorim, Linne, & Lourenco, 2007). In addition, obesity in pregnancy is a risk factor for pre-eclampsia,

pregnancy-associated hypertension, maternal death, and complications during labor and delivery (Institute of Medicine (US) and National Research Council (US) Committee to Reexamine IOM Pregnancy Weight Guidelines [IOM], 2009). EGWG also promotes difficulties with fetal monitoring, increases the need for specialized medical equipment and greater clinical support, increases risk for an operative delivery, and creates problems with anesthesia (Elliott-Sale, Barnett, & Sale, 2015; Hawkins et al., 2014).

Besides negatively affecting the mother, it is recognized that the intrauterine environment affects the health of the child. Complications for children born to mothers with EGWG include neonatal problems such as macrosomia and respiratory morbidity (Muktabhant, Lawrie, Lumbiganon, & Laopaiboon, 2015; Schummers, 2015). Long-term postpartum concerns include fetal overnutrition, an unlikeness to breastfeed, and childhood obesity (Elliott-Sale et al., 2015; IOM, 2009).

### **Scope of Problem**

Gaining too much weight during pregnancy is an international concern, and guidelines in multiple countries are calling for increased monitoring of EGWG in pregnant patients (Muktabhant et al., 2015). Nationally, according to the most recent Vital Statistics System birth data, 47.5% of women gain too much weight during pregnancy (Branum, Sharma, & Deputy, 2016; Deputy, Sharma, & Kim, 2015). Furthermore, in Hawaii, 40.5% of women were reported to have excessive weight gain during pregnancy (Deputy et al., 2015). These statistics demonstrate a universal problem that should be addressed due to the potential adverse health outcomes during and after pregnancy. These findings presented an opportunity to create a change in the standard of care or current practice by applying reliable knowledge and findings to this quality improvement initiative.

## **Current Recommendations for Diet and Exercise in Pregnancy**

All healthy women with normal pregnancies can be physically active, and exercise during pregnancy should be encouraged (Kader, & Naim-Shuchana, 2014). The American College of Obstetricians and Gynecologists (ACOG) guidelines report that exercise in pregnancy carries minimal adverse effects, offers benefits to most women, and regular physical activity while pregnant improves or maintains physical fitness, minimizes excessive weight gain, and reduces risk of complications for mother and child (2015). The ACOG guidelines state that modification to exercise may be needed and clinical evaluation should be performed to recommend an exercise program however, women with normal pregnancies should engage in both aerobic and strength-conditioning exercise before, during, and after pregnancy (ACOG, 2015). In women with medical or obstetric complications, it is advised that obstetric care providers consider anatomic and physiologic factors as well as fetal requirements before recommending physical activity to these patients. Contraindications to aerobic exercise during pregnancy (see Table 1) are presented in ACOG guidelines (2015, p. 2).

In addition, recommendations for nutrition during pregnancy from ACOG (2018) instruct patients to follow the United States Department of Agriculture's MyPlate website that shows amounts and types of foods to consume during each stage of pregnancy. Clinicians and patients can go to the government website ([www.choosemyplate.gov](http://www.choosemyplate.gov)), enter age, sex, pregnant, trimester, weight, height, and physical activity level to calculate a food plan for every trimester in pregnancy (United States Department of Agriculture, 2019). An example of a plan created for a hypothetical 35-year-old patient in the third trimester, with a pre-pregnancy weight of 150 pounds, a height of 5 feet and 5 inches, and physical activity level of 30 – 60 minutes of moderate activity daily is presented at the end of this document (see Figure 1).



Although guidelines for recommended weight gain, diet, and exercise in pregnancy are published and widely accepted, research suggests that providers can do more to educate and motivate pregnant patients to follow the IOM (2009) or the ACOG (2015; 2018) publications (Whitaker, Wilcox, Liu, Blair, & Pate, 2016). Furthermore, the prevalence of EGWG also demonstrates need for a change in the standard of care regarding nutrition and exercise during pregnancy. Searching the literature was the next step to determine the best way to address this problem.

### **Literature Review**

Literature review using the PUBMED, CINAHL, and Cochrane databases was conducted searching for evidence of intervention during pregnancy that reduces EGWG. The PUBMED search query was “(pregnancy[Title] OR pregnant[Title] AND diet[Title] OR nutrition[Title] AND exercise[Title] OR physical activity[Title] AND weight gain[Title])”. The CINAHL query in the title field was “TI (pregnancy or pregnant) AND TI (diet OR nutrition) AND TI (exercise OR physical activity) AND TI weight gain.” The Cochrane search terms included in the title, abstract, keywords were “pregnancy AND diet AND exercise AND weight.” The PUBMED search resulted in 16 articles, the CINAHL search yielded 15 articles, and the Cochrane search provided an additional two articles. Duplicate papers, research focusing on specific ethnic populations and studies focused on non-pregnant women with gestational diabetes were excluded from the review. This resulted in 11 articles that were evaluated and included in the synthesis. Two major themes were extracted from the literature review and are presented below.

#### **Theme 1: Diet and Exercise Education Reduced EGWG**

Six of the studies found that diet, exercise, or both together worked to reduce EGWG in women participating in any intervention (Bogaerts et al., 201; Elliott-Sale et al., 2015;

International Weight Management in Pregnancy (i-WIP) Collaborative Group, 2017; Muktabhant et al., 2015; Ruchat et al., 2012; Thangaratinam et al., 2012; Yeo, Walker, Caughey, Ferraro, & Asafu-Adjei, 2017). For example, Muktabhant et al., (2015) was a Cochrane database meta-analysis study that included 49 randomized-controlled trials involving 11,444 women. The results from the meta-analysis documented that diet or exercise or both interventions reduced the risk of EGWG an average of 20% overall (risk ratio [RR] 0.80, 95% confidence interval [CI] 0.73 to 0.87;  $I^2 = 52\%$ ). Elliott-Sale et al., (2015) also conducted a meta-analysis of randomized controlled trials and found that exercise significantly reduced gestational weight gain (weighted mean difference =  $-2.22$  kg, CI:  $-3.14$  to  $-1.3$ ,  $p \leq 0.00001$ ). Similarly, Yeo et al., (2017) completed a meta-analysis of randomized controlled trials and reported that nine (28%) of 32 studies reviewed demonstrated significant reductions in GWG in response to diet and exercise interventions (95% CI:  $-2.55$  to  $-0.86$ ).

Five of these studies were systematic reviews and meta-analysis of randomized controlled trials and represent the highest level of evidence. Therefore, incorporating an education intervention about both diet and exercise was one recommended approach to decreasing the incidence of EGWG. This finding was incorporated into this practice change by providing an increased frequency and duration of exercise and nutrition counseling during regular antepartum visits at the implementation site as compared with the standard of care and current practice.

### **Theme Two: Intervention More Than Just Education May Further Reduce EGWG**

Four articles reported the results from studies that included supervised, prescribed, or guided exercise as part of an intervention in addition to nutrition and exercise counseling to further reduce EGWG (Choi, Fukuoka, & Lee, 2013; Hui et al., 2012; Mottola et al., 2010;

Ruchat et al., 2012). For example, systematic review and meta-analysis by Choi, et al., (2013) showed that patients that engaged in supervised physical activity in addition to receiving nutrition education had a significantly lower average gestational weight gain ( $-1.17$  kg) for overweight or obese pregnant women in the intervention groups compared with women in the control groups and found that exercise interventions alone gained  $0.91$  kg less (95% CI:  $-1.76, -0.06$ ). Ruchat et al., (2012) similarly found that, based on the IOM guidelines, the percentage of women who did not gain excessively during the entire course of pregnancy was 47% in the control group, and about 67% in the partially-supervised exercise group regardless of exercise intensity ( $W2 = 4.72$ ,  $P = 0.32$ ). Besides supervised exercise, use of logs to monitor diet and exercise also reduced EGWG (Mottola et al., 2015), and Hui et al., (2012) concluded that prescribed exercise regimens significantly decreases EGWG ( $P < 0.008$  or  $P < 0.015$ ).

The studies supporting theme two are mostly high-level and consistent. The results suggested that an approach that goes beyond education further decreased the amount of EGWG. This finding was incorporated into this practice change through intervention that included not only educating patients about diet and exercise in pregnancy, but also by providing individual exercise and nutrition guidance, motivation through use of exercise and dietary tracking, and frequent and regular feedback to patients. Together, both themes aligned with the purpose of this project which was to determine whether implementing a nutrition and exercise program consisting of frequent and regular education, motivation, and monitoring compared with standard of care would reduce excessive weight gain in pregnancy for patients in the site clinic.

### **Literature Critique and Grading Tool Used**

The studies meeting the inclusion criteria were critiqued using the Melnyk Levels of Evidence rating system (Melnik, 2004), and can be viewed in Table 2. The 11 articles are listed

with the individual level of evidence assigned to each (See Table 3). Six of the articles were systematic reviews or meta-analyses of randomized controlled trials, four were randomized controlled trials, and one was a cohort study. The randomized controlled studies in these articles included data and results for over 16,000 women. The studies produced consistent results regarding the impact of nutrition and exercise to achieve healthy weight gain and recommended physical activity in pregnancy. As a result of these findings, the quality of the evidence is rated as high.

**Limitations.** Most of the articles highlighted the need for further research based on specific health outcomes associated with nutrition and physical activity, and most also called for the periodic review of the guidelines so these can be updated to provide a more comprehensive understanding and approach to nutrition and exercise during pregnancy. Besides a general calling for continued investigation, an important limitation to note was the lack of research articles reporting results from studies conducted on pregnant women in Hawai'i. This final DNP project can help clarify the need for practice change and the effect of diet and exercise intervention for women in one clinic in Hawaii.

### **Application to DNP Project**

The literature reviewed and themes discovered provided the foundation for this DNP project that focused on implementing an intervention to reduce EGWG thereby reducing possible development of complications and increasing positive health outcomes for mothers and babies. Specifically, a formal nutrition and exercise intervention, above the standard of care or current practice, was developed and implemented to reduce EGWG in the implementing site. The incorporation of both the education and monitoring of nutrition changes and exercise during pregnancy had the potential to better address aims of the project and result in more women

demonstrating adequate weight gain during pregnancy. The project also provided an opportunity to establish similar programs through the establishment of a protocol that other providers and organizations could use.

### **Conceptional Framework**

A conceptional model or framework is a tool that can be used to provide an organizing structure for this practice change. The Bernadette Mazurek Melnyk conceptual model (Melnik model) guided this DNP project during the development of the intervention, the identification of expected results for patients, and the selection of appropriate instruments to measure outcomes. The Melnyk model details the process as a merging of science and art in an evidence-based practice (EBP) approach within a context of caring in order to achieve the highest quality of care for patients (Melnik, 2014). Initially, there needs to be identification of a burning clinical questions followed by collection of relevant and best evidence. Next, evidence should be evaluated critically and then combined with clinical expertise, patient preferences and values before deciding on and creating change in the practice. Lastly, after implementation, a process of evaluation and modification will ensure the context of caring is maintained and will allow for fluid best practices.

For this practice change project, the burning question was how do providers best address the problem of EGWG in their pregnant patients? Collection of relevant and best evidence was done through literature review and rating of the evidence as described previously. Recommendations based on the evidence were incorporated with clinical expertise of the content expert, an obstetrician-gynecologist who owns the practice where this practice change took place. Additionally, attitudes, beliefs, and practices were assessed and considered when creating a nutrition and physical activity plan for each individual patient. Further, evaluation and

modification of the plans were done regularly at each visit. Last, measurement of outcomes individually and as a cohort and population were done using chart review and patient self-reported surveys.

### **PICO Question/Statement**

The question this project attempts to answer is, for pregnant women in a clinic on Oahu (P), will implementing a nutrition and exercise program (I), compared with standard care (C), reduce excessive gestational weight gain (O)?

### **Purpose/Goals/Aims**

The purpose of this DNP project was to promote healthy weight gain during pregnancy through patient education, nutrition and exercise monitoring, and encouragement of pregnant women and their families to follow recommendations. This outcome-focused project satisfied two aims: 1) To assess and develop pregnant women's awareness and positive attitudes about weight gain, nutrition, and exercise during pregnancy by using an evidence-based educational and motivational program; 2) To reduce the rate of EGWG through successful implementation of the program.

### **Methods**

#### **Project Design**

An evidence-based (EB) approach was used for this DNP project as it translates current scientific evidence and applies it to clinical practice in order to improve health outcomes. The purpose of EBP is to use the best evidence available to make patient-care decisions as well as, in the case of this project, how much time and energy is spent counseling about weight gain, nutrition, and exercise in pregnancy, which type of exercise and diet regimen is best used for reduction of EGWG incidence, and how best to motivate patients to follow the recommended

guidelines. Arguably, the best evidence stems from research but EBP goes past scientific studies. This DNP project incorporates EB science, clinical expertise, and patient attitudes, beliefs, and practices into specific recommendations for exercise and diet.

### **Human Subjects Consideration**

This project did not require approval by Institutional Review Boards (IRBs) because it is not a research study designed to develop or contribute to generalizable knowledge. This quality improvement project applied the best clinical evidence from research to change practice as a means of improving patient health outcomes. Only de-identified, aggregate data were used for analysis, and HIPPA regulations regarding privacy and confidentiality were adhered to as part of the practice requirements.

### **Risk-Benefit Analysis**

Risk-benefit analysis is an evaluation that considers potential costs and benefits of risks involved. For this DNP project, the risk-benefit ratio was determined to be small; the risks and costs of implementing the program were minor compared to the potential health benefits gained through the practice change.

### **DNP Project Setting**

The women's health practice where this DNP project took place is in Central O'ahu. The staff consisted of one Obstetrician-Gynecologist and one student provider (the DNP student who implemented the project [DNP student]). The other half of the practice is in Honolulu but although that site did not experience the practice change, it was included in data analysis. Most types of health insurance coverages are accepted for services provided at the project implementation site, including Medicare and Medicaid. About 30% of patients have Military health care insurance and 45% have some type of Hawaii Medical Service Association health

insurance. There are currently over 4000 active patients, all female, with an average age of 42.6 years (standard deviation 17.5, range 13 – 107). Patient self-designated race indicates that the patient population is about 46% white, 29% Asian, 16% Native Hawaiian or Pacific Islander, 5% black or African American, and 4% other. Outpatient services provided include obstetrical care such as pre-pregnancy and infertility testing and counseling, antepartum and postpartum care, and referral services for advanced fetal diagnostic and treatment services and family planning services. Gynecological outpatient services provided include routine examinations, diagnosis and treatment of disease, referral services, nutrition and exercise counseling, and other health maintenance and disease prevention services.

### **Sampling and Data Collection**

Data collection was the responsibility of the DNP student and the dataset was inspected for univariate outliers and missing entries. Pre-implementation baseline EGWG data for the whole practice was collected for a total of 1003 patients who were provided services between October 1, 2015 and September 1, 2018. Selection criteria included women with a weight and BMI recorded within the first 20 weeks of pregnancy, a weight within 10 days before delivery, and at least eight total prenatal visits including the confirmation of pregnancy visit. A simple random sample of 306 women was used (96% confidence level; 5% margin of error).

Post-implementation EGWG data for all patients who received obstetric services between September 7, 2018 (implementation start-date) and February 17, 2019 (end-date) and gave birth between October 1, 2018 and February 17, 2019, weight and BMI recorded within the first 20 weeks of pregnancy, a weight within 10 days before delivery, and at least eight total prenatal visits including the confirmation of pregnancy visit was also collected through chart review. A



total of 84 patients were included in the population data set that met the selection criteria for analysis.

Information was gained about the attitudes and beliefs of women in the practice through use of a nutrition and physical activity survey that was completed during their first pregnancy visit between September 7, 2018 and February 17, 2019. This questionnaire also served to help guide education of patients and the creation of a nutrition and exercise plan that is tailored to the individual and encompasses a culturally sensitive plan of care. A total of 82 patients completed the survey and were included in the data analysis.

### **Intervention Design**

For the program implementation, all eligible patients at the Central Oahu clinic site were exposed to the nutrition and exercise practice change. Inclusion criteria were women who were in any trimester of pregnancy without contraindications to the nutrition or exercise interventions recommended by the ACOG and IOM practice guidelines. This approach yielded the highest number of participants in the shortest amount of time. A Gantt chart is provided as a visual overview of the project timeline (see Figure 2).

**Structure of the antepartum visit.** The DNP student implementing the intervention and the physician work together to care for pregnant patients in this practice. The typical visit starts with the DNP student obtaining a history and performing a physical examination of the patient, as appropriate. The DNP student gives a patient report to the physician who then visits the patient and completes the appointment. Typical prenatal visit intervals for women with uncomplicated pregnancies are at every 3-4 weeks until 28 weeks of gestation, every 2 weeks from 28 to 35 weeks, and then weekly until delivery. For the intervention, the same visit

structure was utilized, and the first part of the visit with the DNP student was when the patient received the intervention.

**Visit one.** Starting on day one of implementation, on or after September 7, 2018, patients receiving obstetrical services that met the previously described inclusion criteria were asked to voluntarily complete the survey about nutrition, physical activity, and weight gain in pregnancy (see Appendix A) while the patient was waiting to be seen and included the patients name and date. At that time, the intervention was explained and all patients who were asked to complete the survey did so and verbally agreed to participate in the practice change. Lastly, a chart with the date of service, weight, and BMI for all visits was reviewed with the patient. Women were given the opportunity to ask questions but unless specific nutrition or exercise comments were involved, education about diet and exercise was deferred to the second visit. This phase of the practice change implementation required approximately five minutes during the first visit.

**Visit two.** The second visit involved discussion about the individual's chart, nutrition and physical activity questionnaire results, general education about weight gain, diet, and exercise during pregnancy, and review of patient handouts to reinforce current national recommendations. Diet and exercise log templates were offered to the patient but use of any other recording systems were encouraged as well. A plan was created by the DNP student and the patient, approved by the physician, and aimed at avoiding EGWG through nutrition and exercise recommendations. This intervention during the second patient visit also required approximately five minutes to complete.

**Visit three and all subsequent visits.** All visits after the second encompassed review of the patient's chart including the cumulative weight gained and weight gained since the last visit. The nutrition and exercise logs were reviewed, and the treatment plan and goals were reaffirmed

or modified as deemed appropriate by the DNP student and patient. This typically took less than five minutes to complete.

**Between 32 and 36 gestational weeks of pregnancy.** A short, anonymous post-implementation survey was given to patients in addition to the review of weight and nutrition and exercise logs.

### **Data Collection Materials: The Questionnaires**

**Pre-Implementation Survey.** To study the results of the practice change and to determine if EGWG was affected, data was gathered through chart reviews of all patients. To evaluate the attitudes and beliefs about gestational weight gain, nutrition, and exercise during pregnancy, a questionnaire addressing these topics was distributed to patients to fill out. Options for responding to items on the questionnaire consisted of short answers, yes/no responses, and multiple-choice selections to assess participants' beliefs, attitudes, and practices regarding weight, nutrition, and exercise during pregnancy (see Appendix A). In addition to collection of data, this questionnaire was used for creation of individual plans for nutrition and exercise intervention.

**Post-Implementation Survey.** To determine if awareness was created in the selected population about nutrition, exercise, and gestational weight gain in pregnancy, a post-implementation questionnaire was used that collected qualitative opinions of patients.

## **Results**

### **Reduction of Number of Patients with EGWG**

Pre-implementation BMI, weight, and EGWG data for the patients receiving care in the practice was collected as a baseline and resulted in a total of 1003 patients' data. A simple random sample of 306 women was used for analysis. For determination of change in EGWG

after the project change, a total of 84 patients were included. Results indicated that EGWG was reduced from 39.9% to 26.2% six months after implementation (both sites, n=84). Further, the percent of patients exposed to the practice change at the implementation site with EGWG was found to be 22.2% (n=45) compared with 30.8% of non-program patients (n=39) post-implementation. Results strongly suggest that the DNP project implementation reduced the number of women with EGWG at the project site and for the whole practice overall. Refer to Figure 3 for a summary of results.

### **Awareness and Positive Attitudes in Pregnancy**

A total of 85 patients completed the pre-implementation survey which was not anonymous and examines patient attitudes, beliefs, and practices. Select results are summarized in Table 4. The individual results from the pre-implementation surveys was also used as a clinical tool when creating a plan for avoiding EGWG.

A total of 69 patients completed the anonymous post-implementation survey. Results reveal that most patients felt that the program helped to create positive attitudes toward diet (87%) and physical activity (90%) in pregnancy. Most of the patients reported increased physical activity intensity, duration, or frequency due to the intervention (86%) and all (100%) responded that this program would benefit other women in pregnancy (see Table 5).

### **Discussion**

The final DNP project exemplifies skills and knowledge gained throughout the highest level of educational preparation in nursing. This practice-focused DNP project was developed on the basis of current scientific findings. The American Association of Colleges of Nursing (AACN) describes DNP curricular elements and competencies in the Essentials of Doctoral Education for Advanced Nursing Practice (American Association of Colleges of Nursing

[AACN], 2006). Preparation and execution of the practice change was an intense practice immersion experience allowing the DNP student to lead in the development, implementation and evaluation of a program that demonstrated the student's scientific knowledge, scholarship, and advanced nursing practice competencies. Examples of the application of three of the eight foundational outcome competencies during this final DNP project are discussed in the following sections.

### **Essential I: Scientific Underpinnings for Practice**

The principles and laws that govern the life-process, well-being, and optimal function of human beings, sick or well; the patterning of human behavior in interaction with the environment in normal life events; and the nursing actions or processes by which positive changes in health status are affected was demonstrated in this practice change (AACN, 2006). It was found that EGWG is a physiological problem that was influenced positively by increasing the amount of time and frequency that the clinician spent on education and motivation for change. For example, by taking a few extra minutes at each appointment to show the patient weight gain and relating that to their workout and food logs, they were able to receive instant feedback and could modify their behavior through professionally guided diet and exercise plans. Incorporating patient needs and values arguably contributed to willingness and even eagerness to make healthier choices in pregnancy. This project shows that nurses in specialty practice settings can influence patients in ways that will improve health status by considering scientific principles and patterning of human behavior.

### **Essential III: Clinical Scholarship and Analytical Methods for EBP**

Using analytic methods to critically appraise existing literature and other evidence

to determine and implement the best evidence for practice, followed by designing and implementing processes to evaluate outcomes of practice and practice patterns, demonstrates competency in Essential Three (AACN, 2006). This EBP practice change initiative involved designing, directing, and evaluating quality improvement practices shown to promote safe, effective, and patient-centered care. Reviewing literature about EGWG interventions was done, and application of relevant findings guided development of an innovation in the standard of care that improved patient outcomes. Further, use of the electronic medical record (EMR) to collect data from practice demonstrates effective use of technology to efficiently analyze trends and outcomes of this DNP project. One specific example is gathering pre-implementation EGWG; EMR review saved time, consisted of high-quality data, and allowed for a larger population data set than using other methods of data acquisition. This availability of data via use of technology can also serve to facilitate other practice change initiatives through examining patterns of behavior, prediction of outcomes, and identifying gaps in evidence for practice. Competency in essential three promotes a culture of clinical scholarship and use of evidenced-based practices that can be used to provide the best nursing care to patients.

### **Essential VIII: Advanced Nursing Practice**

The essential eight competency involves ability to conduct comprehensive and systematic assessments of health and illness parameters in complex situations, and to incorporate diverse and culturally sensitive approaches to care (AACN, 2006). For this DNP project, identifying a clinical problem, performing the literature review, and sampling data from the whole practice population represents a comprehensive and systematic assessment of the problem of EGWG in the clinic. After determining the best approach using high-level evidence, clinical expertise, and

patient preferences, design and implementation of the program was commenced, and evaluation of the outcomes show that this competency was achieved.

Further, another part of the level eight competency is to develop and sustain therapeutic relationships and partnerships with patients and their families. Frequent and regular monitoring of patients and what they do daily sets the stage for creating and sustaining therapeutic relationships with the pregnant women and their families. The openness created when talking about diet and exercise extended to other questions and concerns during pregnancy which, arguably, allowed for better care above and beyond the benefits of reducing EGWG. For example, more than one patient reached out for help with depression, stating that they felt close enough to the DNP student to not be embarrassed to say they are struggling.

Lastly, the essential eight competency involves using advanced levels of clinical judgement, systems thinking, and accountability in designing, delivering, and evaluating EB care to improve patient outcomes (AACN, 2006). Reflecting on the results of this practice change, the intervention helped patients make better choices during pregnancy through use of clinical expertise and judgement when determining which types of diet and exercise to prescribe. One example of systems thinking is to look at the whole picture of the patient lifestyle to circumnavigate barriers to healthy choices. For example, quite a few patients expressed concern about their motherly, employee, or household duties and how that restricts time allotted for exercise. The DNP student helped to identify when and which type of physical activity they were able to commit to using resources that allowed patients meet goals. This is one example of encompassing the whole rather than a sum of parts when delivering care to patients.

## **Limitations and Recommendations**

This final DNP project was limited to about six months for implementation and evaluation due to time constraints set by the University of Hawaii School of Nursing. As a result, pregnant women who were participating in the project but who had not given birth within the six months timeframe did not have their post-implementation data included in the analysis reported in this paper. Having an increased number of pregnant women participating in this type of education and exercise intervention over a longer time period can provide further data about the effectiveness and acceptability of this type of activity. Moreover, future trials of a practice change following the methods of this project may establish stronger connections between diet, exercise, and weight gain in pregnancy. Another consideration is the use of more objective assessments of self-reported data, for example, to use the pre-test as a post-test to determine quantitative insights into the change in practices in the pregnant women.

## **Conclusions**

This DNP project was successful in reducing the incidence of EGWG in one clinic on O'ahu through use of EB practices, clinical expertise, and patient preferences to create a practice change. Motivational, individually tailored, and culturally sensitive approaches were used to help patients choose healthy kinds and amounts of food to eat, and appropriate and attainable exercise to do to stay healthy in pregnancy. The results of the project suggest that other clinical practices can implement similar programs to help reduce the incidence of EGWG in pregnant women.



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## Appendix A

### Instrument for Data Collection: Pregnancy Nutrition and Physical Activity Questionnaire

#### Nutrition and Physical Activity Questionnaire (Voluntary)

Goal: To evaluate women's attitudes, beliefs, and practices about nutrition and physical activity in pregnancy

- 1) Name:
  - 2) Birthdate:
  - 3) Date:
  - 4) Weeks Pregnant (GA):
  - 5) Estimated Due Date (EDD):
  - 6) Weight Today:
- 

#### NUTRITION

- |  |  |
|--|--|
| <p>7) How many meals and snacks do you eat each day?</p> <p><input type="checkbox"/> Meals _____</p> <p><input type="checkbox"/> Snacks _____</p> <p>8) Are there any foods or beverages that you cannot or will not eat?</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes (Please describe)</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>9) Are there foods that you wish you ate more of?</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes (Please describe)</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>10) What do you usually drink and how often?</p> <p><input type="checkbox"/> Water: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Milk: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Coffee: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Tea: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Juice: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Sports drinks: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Wine/beer/alcoholic drinks: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Regular soda: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Diet soda: _____ oz /cups each _____ day / week / month</p> <p><input type="checkbox"/> Other diet drinks (low or no calorie): _____ oz /cups each _____ day / week / month</p> | <p>11) How many times do you eat fruits and vegetables during a normal day?</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Less than once/ day</p> <p><input type="checkbox"/> Once/ day</p> <p><input type="checkbox"/> Twice/ day</p> <p><input type="checkbox"/> Three times or more/ day</p> <p>12) How do you determine what foods to eat?</p> <p><input type="checkbox"/> I usually decide how much, when, and what to eat</p> <p><input type="checkbox"/> My family usually decides how much, when, and what to eat</p> <p><input type="checkbox"/> What food costs determines how much, when, and what to eat</p> <p><input type="checkbox"/> The availability or convenience of foods determines how much, when, and what to eat</p> <p>13) How many times to you eat protein foods (for example eggs, meat) during a normal day?</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Less than once/ day</p> <p><input type="checkbox"/> Once/ day</p> <p><input type="checkbox"/> Twice/ day</p> <p><input type="checkbox"/> Three times or more/ day</p> <p>14) What types of protein foods do you normally eat?</p> <p><input type="checkbox"/> Beef/Buffalo</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Less than once/ day</p> <p><input type="checkbox"/> Once/ day</p> <p><input type="checkbox"/> Twice/ day</p> <p><input type="checkbox"/> Three times or more/ day</p> |
|--|--|

- ☐ Chicken/Turkey
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Fish/Seafood
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Pork/Lamb
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Hot Dogs/Lunch Meat
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Meat Spreads/Pâté
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Beans
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Eggs
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Tofu
  - ☐ Never
  - ☐ Less than once/ day

- ☐ Once/ day
- ☐ Twice/ day
- ☐ Three times or more/ day
- ☐ Yogurt
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Cheese Product (Kraft, Velveeta...)
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Soft Cheese (Feta, Brie, Blue-Veined, and Queso Fresco)
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day
- ☐ Hard Cheese (American, Cheddar, Swiss...)
  - ☐ Never
  - ☐ Less than once/ day
  - ☐ Once/ day
  - ☐ Twice/ day
  - ☐ Three times or more/ day

15) Do you ever eat anything that is not food, such as ashes, chalk, clay, dirt, large quantities of ice, or starch (laundry/cornstarch)?

- ☐ No
- ☐ Yes (Please describe) \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

16) Are you on a special diet?

- ☐ No
- ☐ Yes (Please describe) \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

17) Do you have a target weight gain for this pregnancy?

☐ No

☐ Yes (Please describe)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

18) Have you had any complications during this or previous pregnancies?

☐ No

☐ Yes, please specify

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

19) Do you have any medical/ health/ dental problems?

☐ No

☐ Yes (Please describe). Was this problem diagnosed by a doctor/ dentist? Yes / No  
When?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

☐ Was this problem diagnosed by a doctor / dentist?

(1) No

(2) Yes. If yes, when?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

20) Please check all the following you routinely use and circle amount

☐ Prenatal vitamins: ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Other vitamin and/or minerals supplements: ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Over-the-counter drugs (laxatives, pain killers, etc.) : ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Prescription medication: ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Herbs/Herbal Supplements (Echinacea, ginger, etc.): ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Tobacco Street drugs (Marijuana, cocaine, methamphetamines, etc.): ☐ Daily / ☐ Less than once daily / ☐ More than once daily

☐ Other, please specify:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

21) Are you currently breastfeeding?

☐ No

☐ Yes. Are you planning on stopping? ☐ No ☐ Yes: When? \_\_\_\_\_

PHYSICAL ACTIVITY while you are NOT at work

22) Preparing meals (cook, set table, wash dishes)

☐ None

☐ Less than 1/2 hour per day

☐ 1/2 to almost 1 hour per day

☐ 1 to almost 2 hours per day

☐ 2 to almost 3 hours per day

☐ 3 or more hours per day

23) Dressing, bathing, feeding children while you are sitting

☐ None

☐ Less than 1/2 hour per day

☐ 1/2 to almost 1 hour per day

☐ 1 to almost 2 hours per day

☐ 2 to almost 3 hours per day

☐ 3 or more hours per day

24) Dressing, bathing, feeding children while you are standing

☐ None

☐ Less than 1/2 hour per day

☐ 1/2 to almost 1 hour per day

☐ 1 to almost 2 hours per day

☐ 2 to almost 3 hours per day

☐ 3 or more hours per day

25) Playing with children while you are sitting or standing

☐ None

☐ Less than 1/2 hour per day

☐ 1/2 to almost 1 hour per day

☐ 1 to almost 2 hours per day

☐ 2 to almost 3 hours per day

☐ 3 or more hours per day

26) Playing with children while you are walking or running

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

27) Carrying children

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

28) Taking care of an older adult

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

29) Sitting and using a computer or writing, while not at work

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

30) Media screen time (TV, videos, games, social media, browsing the internet, shopping online)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 2 hours per day
- ☐ 2 to almost 4 hours per day
- ☐ 4 to almost 6 hours per day
- ☐ 6 or more hours per day

31) Sitting and reading, talking, or on the phone, while not at work

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

32) Playing with pets

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

33) Light cleaning (make beds, laundry, iron, put things away)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

34) Physically Shopping (for food, clothes, other items)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

35) Heavier cleaning (vacuum, mop, sweep, wash windows, wash car)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day



36) Moving lawn while on a riding mower

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

37) Mowing lawn using a walking mower, raking, gardening

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

#### GOING PLACES...

38) Walking slowly to go places (such as to the bus, work, visiting) Not for fun or exercise

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

39) Walking quickly to go places (such as to the bus, work, or school) Not for fun or exercise

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

40) Driving not riding in a car or bus

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

#### FOR FUN OR EXERCISE...

41) Walking slowly for fun or exercise

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

42) Walking more quickly for fun or exercise

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

43) Walking quickly up hills for fun or exercise

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

44) Jogging

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

45) Prenatal exercise class

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

46) Other exercise class (not specifically tailored to pregnancy)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

47) Swimming

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

48) Dancing

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

49) Doing other things for fun or exercise? Please describe.

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

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#### AT WORK

50) Sitting at work or in class

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 2 hours per day
- ☐ 2 to almost 4 hours per day
- ☐ 4 to almost 6 hours per day
- ☐ 6 or more hours per day

51) Standing or slowly walking at work while carrying things (heavier than a 1-gallon milk jug)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

52) Standing or slowly walking at work not carrying anything

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

53) Walking quickly at work while carrying things (heavier than a 1-gallon milk jug)

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

54) Walking quickly at work not carrying anything

- ☐ None
- ☐ Less than 1/2 hour per day
- ☐ 1/2 to almost 1 hour per day
- ☐ 1 to almost 2 hours per day
- ☐ 2 to almost 3 hours per day
- ☐ 3 or more hours per day

55) Any additional comments, concerns, or suggestions?

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## Tables

Table 1

*Absolute and Relative Contraindications to Aerobic Exercise During Pregnancy*

Absolute Contraindications	Relative Contraindications
Hemodynamically significant heart disease	Anemia
Restrictive lung disease	Unevaluated maternal cardiac arrhythmia
Incompetent cervix or cerclage	Chronic bronchitis
Multiple Gestation at risk of premature labor	Poorly controlled type 1 diabetes
Persistent second- or third-trimester bleeding	Extreme morbid obesity or underweight (BMI less than 12)
Placenta previa after 26 weeks gestation	History of extremely sedentary lifestyle or heavy smoker
Premature labor during the current pregnancy	Intrauterine growth restriction in current pregnancy
Ruptured Membranes	Poorly controlled hypertension
Preeclampsia or pregnancy-induced hypertension	Poorly controlled seizure disorder or hypothyroidism
Severe anemia	Orthopedic limitations

Table 2

*Melnyk Levels of Evidence: Rating system and number of articles for the hierarchy of evidence for intervention/treatment questions*

Level	Qualifications	Articles in Review
1	Systematic review & meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analyses	6
2	One or more randomized controlled trials	4
3	Controlled trial (no randomization)	0
4	Case-control or cohort study	1
5	Systematic review of descriptive & qualitative studies	0
6	Single descriptive or qualitative study	0
7	Expert opinion	0

Table 3

*List of articles used in literature review sorted by first-author and showing year, title, publication and level of evidence based on the Melnyk Levels of Evidence rating system (Melnik, 2004).*

Year	First Author	Title	Publication	Level
2013	Choi	The effects of physical activity and physical activity plus diet interventions on body weight in overweight or obese women who are pregnant or in postpartum: A systematic review and meta-analysis of randomized controlled trials	Preventive Medicine	1
2015	Elliott-Sale	Exercise interventions for weight management during pregnancy and up to 1 year postpartum among normal weight, overweight and obese women: A systematic review and meta-analysis	British Journal of Sports Medicine	1
2017	International	Effect of diet and physical activity-based interventions in pregnancy on gestational weight gain and pregnancy outcomes: meta-analysis of individual participant data from randomised trials	The BMJ Cochrane Database of Systematic Reviews	1
2015	Muktabhant	Diet or exercise, or both, for preventing excessive weight gain in pregnancy		1
2012	Thangaratinam	Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence	The BMJ Obesity Reviews: An Official Journal of the International Association for the Study of Obesity	1
2017	Yeo	What characteristics of nutrition and physical activity interventions are key to effectively reducing weight gain in obese or overweight pregnant women? A systematic review and meta-analysis		1
2017	Bogaerts	INTER-ACT: Prevention of pregnancy complications through an e-health driven interpregnancy lifestyle intervention - study protocol of a multicentre randomised controlled trial	BMC Pregnancy and Childbirth	2
2014	Hawkins	Impact of an exercise intervention on physical activity during pregnancy: The behaviors affecting baby and you study	American Journal of Public Health	2

2012	Hui	Lifestyle intervention on diet and exercise reduced excessive gestational weight gain in pregnant women under a randomised controlled trial	BJOG: An International Journal of Obstetrics & Gynaecology Medicine & Science in Sports & Exercise	2
2012	Ruchat	Nutrition and exercise reduce excessive weight gain in normal-weight pregnant women	Medicine & Science in Sports & Exercise	2
2010	Mottola	Nutrition and exercise prevent excess weight gain in overweight pregnant women	Exercise	4

Table 4

*Select Results from Attitudes, Beliefs, and Practices Pre-implementation survey*

Weight Gain	Identified any target weigh gain	40%
(Percentage of patients)	Identified a targeted weight gain within guidelines	22.40%
	Daily average Number of Meals / Snacks	2.8 / 2.8
	Daily ounces consumed of Water / high-calorie beverages	63.6 / 55.9
Nutrition	Daily consumption of servings of fruit & vegetables	1.8
	Sedentary activity	83.2
	Light activity	82.0
Physical	Moderate activity	60.1
Activity	Vigorous activity	2.3
(Average hours per week)	Household/caregiving	69.8
	Occupational	79.5
	Sports/exercise	6.3
	Transportation	155.8

Table 5

Results from anonymous post-implementation survey (n = 69)

Patient-Reported Outcomes	Number of Yes responses	Percentage of YES responses
Reached target goals	52	75.4%
Changed attitudes, beliefs, or practices about weight gain in pregnancy	65	94.2%
Positively changed attitudes, beliefs, or practices about nutrition in pregnancy	60	87.0%
Positively helped change attitudes, beliefs, or practices about physical activity in pregnancy	62	89.9%
Increased physical activity intensity, duration, or frequency after learning about exercise guidelines in pregnancy	59	85.5%
Felt like other women would benefit from this type of program	69	100.0%



## Figure Captions Page

Figure 1. *An example of a diet plan created for a hypothetical 35-year-old patient in the third trimester, with a pre-pregnancy weight of 150 pounds, a height of 5 feet and 5 inches, and physical activity level of 30 – 60 minutes of moderate activity daily.*

Figure 2. *A Gantt chart as a visual overview of the project timeline.*

Figure 3. *Graph showing pre-implementation and post-implementation EGWG trend.*

## Figures

Figure 1



Figure 2

Task Name	August	September	October	November	December	January	February	March	April
Proposal Presentation	16								
Form 2	16								
Advance to Candidacy		6							
Complete Program Documents									
Nutrition Questionnaire		6							
Physical Activity Questionnaire		6							
Nutrition Log		6							
Physical Activity Log		6							
Project Implementation									
Meeting for Project Site		6	4	1	6	3	7		
Implementation		7					17		
Data Gathering									
1st Data Set (Pre-implementation)		1							
2nd Data Set (Post-implementation)							17		
Final Paper / Presentation									
Drafts							8		
Defense / Presentation									2

Figure 3

